INVESTIGATOR'S ANNUAL REPORT

United States Department of the Interior

National Park Service

All or some of the information you provide may become available to the public.

OMB # (1024-0236)
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Form No. (10-226)

Reporting Year: 2010	**Park:** Glacier Bay NP & PRES	**Select the type of permit this report addresses:** Scientific Study

Principal Investigator: Brendan Moynahan	**Office Phone:** 907.364.2621
Mailing Address: 3100 National Park Road Juneau, AK 99801 USA	**Office Fax:** 907.364.1540
	Office Email: brendan_moynahan@nps.gov

Additional investigator or key field assistants(first name, last name, office phone, office email

Name: Mark Lindberg **Phone:** (907) 474-6598 **Email:** mslindberg@alaska.edu

Name: Steve Hoekman **Phone:** 206-547-1721 **Email:** fnsth1@aurora.uaf.edu

Study Title (maximum 300 characters):
Development of a monitoring protocol for Kittlitz's Murrelets

Park-assigned Study or Activity #: GLBA-00142	**Park-assigned Permit #:** GLBA-2009-SCI-0010	**Permit Start Date:** Jul 01, 2009	**Permit Expiration Date:** Dec 31, 2013

Scientific Study Starting Date: Jul 01, 2009	**Estimated Scientific Study Ending Date:** Dec 31, 2013

For either a Scientific Study or a Science Education Activity, the status is:
Continuing

For a Scientific Study that is completed, please check each of the following that applies:

___ A final report has been provided to the park or will be provided to the park within the next two years

___ Copies of field notes, data files, photos, or other study records, as agreed, have been provided to the park

___ All collected and retained specimens have been cataloged into the NPS catalog system and NPS has processed loan agreements as needed

Activity Type:
Monitoring

Subject/Discipline:
Birds / Ornithology

Purpose of Scientific Study or Science Education Activity during the reporting year (maximum 4000 characters):
Under a cooperative (CESU) agreement with the University of Alaska-Fairbanks, we will be conducting a field test of critical components of designs for long-term monitoring of density/abundance/trend of Kittlitz's murrelets in Glacier Bay. The field work will feed back into the office-based protocol development process. We expect that a draft monitoring protocol will be completed in the spring of 2010.

Findings and status of Scientific Study or accomplishments of Science Education Activity during the reporting year (maximum 4000 characters):
The Southeast Alaska Network (SEAN) Vital Signs Monitoring Plan has targeted populations of Kittlitz's Murrelet (Brachyramphus brevirostris), a rare seabird endemic to Alaska and northeastern Russia, for long-term monitoring. Based on results and recommendations from pilot surveys in Glacier Bay during 2009, we implemented numerous changes in July 2010 boat-based line transect surveys, including: preference of 2 observers, increased coverage of Glacier Bay, zig-zag transects in narrow fjords, allocation of effort via unequal probability sampling, and a local variance estimator for encounter rates. Our objectives for this report were to 1)

describe changes for survey methods, 2) estimate abundance of Kittlitz's Murrelets, and secondarily of Marbled Murrelets (B. marmoratus), and 3) place our 2009 and 2010 estimates in meaningful context relative to other recent abundance estimates for Glacier Bay. Changes to methods, particularly use of the local variance estimator, increased precision of estimates relative to 2009. We estimated an abundance of 14,503 ± 1,479 (x ± SE) Kittlitz's and 67,259 ± 5,854 Marbled Murrelets in Glacier Bay during 8-16 July 2010. Abundance in 2010 of Kittlitz's Murrelets was similar to 2009, but more than doubled for Marble Murrelets. We found the largest concentrations of both species in open waters in the mid- to lower portions of the Main Bay, a distribution that was atypical for Kittlitz's Murrelets, which are frequently associated with glacially-influenced habitats in the upper fjords of Glacier Bay. We hypothesized that both species took advantage of exceptionally good foraging opportunities in the lower Bay and that the large increase in the 2010 population of Marbled Murrelets involved immigration of birds from within the region to Glacier Bay. Abundance estimates for both species from 2009 and 2010 were substantially higher than from other recent estimates from Glacier Bay. However, these earlier estimates employed strip transect survey methods, which can be subject to large and variable negative bias. After adjusting these estimates to account for probability of detection and identification, we found evidence that estimates from strip transects have substantially under-estimated abundance for both species and that populations of Marbled Murrelets have increased in 2009 and 2010 relative to 1999-2007, but whether increases in estimated abundance for Kittlitz's in 2009 and 2010 reflect modest increases in population increase, sampling error, differences in methods remains unresolved.

For Scientific Studies (not Science Education Activities), were any specimens collected and removed from the park but not destroyed during analysis?

No

Funding specifically used in this park this reporting year that was provided by NPS (enter dollar amount):	**Funding specifically used in this park this reporting year that was provided by all other sources (enter dollar amount):**
$50,000.00	$0.00

List any other U.S. Government Agencies supporting this study or activity and the funding each provided this reporting year:

For Scientific Studies (not Science Education Activities), were any specimens collected and removed from the park but not destroyed during analysis?

No